

***Bauhinia brachycarpa*, a Chinese species new to Laos**

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Summary : *Bauhinia brachycarpa* Wall. ex Benth. is redescribed, full synonymy is given, distribution mapped. 3 varieties are recognized : var. *brachycarpa*, var. *densiflora* (Franch.) K. & S. S. Larsen, *comb. & stat. nov.*, and var. *microphylla* (Oliv. ex Craib) K. & S. S. Larsen, *comb. nov.* The species is for the first time recorded from Laos.

Résumé : Nouvelle description, synonymie complète et cartes de distribution de *Bauhinia brachycarpa* Wall. ex Benth. 3 variétés sont reconnues : var. *brachycarpa*, var. *densiflora* (Franch.) K. & S. S. Larsen, *comb. & stat. nov.*, et var. *microphylla* (Oliv. ex Craib) K. & S. S. Larsen, *comb. nov.* L'espèce est pour la première fois signalée du Laos.

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During revisionary work on the Chinese species of *Bauhinia* a single mislaid sheath from P have been found to belong to a Chinese species not dealt with in the newly printed Flore du Cambodge, du Laos et du Vietnam, vol. 18 (K. LARSEN, S. S. LARSEN & J. E. VIDAL, 1980). Another collection from the same locality : Muang Sing, situated just across the Laos — Chinese border, turned up from A.

We have here drawn up a full account of the species, including its variation throughout the distribution-area and full synonymy.

We believe to have seen practically all material collected of this species. From the following herbaria materials have been borrowed : A, AAU, ABD, B, C, CAL, E, G, GH, GB, K, L, NY, P, PE, SING, W, all in all *ca.* 350 specimens.

All Chinese province-names are transcribed according to official Chinese transcription, Pinyin, (see also HUMLUM, 1980).

***Bauhinia brachycarpa* Wall. ex Benth.**

In MIQ., Pl. Jungh. : 261 (1852).

KEY TO VARIETIES

1. Leaves broadly ovate — subreniform, 1.6-11.5 cm long.
 2. Young shoots brownish pubescent, later glabrous ; upper surface of leaves glabrous, lower glabrescent to pubescent particularly on the nerves. 1. var. *brachycarpa*
 2. Young shoots and inflorescence densely hairy ; upper surface of leaves glabrescent, lower densely woolly hairy all over..... 2. var. *densiflora*
1. Leaves subreniform, 0.6-1.2 cm long, glabrous..... 3. var. *microphylla*

1. var. **brachycarpa**

- *Bauhinia faberi* OLIV., in HOOK. Ic. Pl. : tab. 1790 (1888) ; type : *Faber 761*, China : Sichuan : Wushan Gorge (lecto-, K, here selected).
- *B. bryoniiflora* FRANCH., Pl. Delav. : 191 (1890) ; type : *Delavay s.n.*, China : Yunnan : Tapintze near Tali, 9.5.1884, (lecto-, P, here selected).
- *B. tortuosa* COLL. & HEMSL., Journ. Linn. Soc., Bot. 28 : 52 (1890) ; type : *Collett 561*, Burma : Shan Hills, Koni (lecto-, CAL).
- *Piliostigma tortuosum* (COLL. & HEMSL.) THOTHATHRI, Bull. Bot. Soc. Beng. 19 : 130 (1967).
- *Bauhinia enigmatica* PRAIN, Journ. Asiat. Soc. Beng. 66 (2) : 496 (1897) ; type : *Abdul Khalil s.n.*, Burma : Shan Hills, Fort Stedman (lecto-, CAL).
- *Piliostigma enigmaticum* (PRAIN) THOTHATHRI, Bull. Bot. Soc. Beng. 19 : 132 (1967).
- *Bauhinia bonatiana* PAMP., Nuov. Giorn. Bot. Ital. 17 : 6 (1910) ; type : *Ducloux 412*, China : Yunnan : Yunnan-sen (not seen).
- *B. cavaleriei* LÉV., Feddes Repert. 11 : 31 (1912) ; type : *Cavalerie 3676*, China : Guizhou : Lo-Fu (lecto-, P, here selected).
- *B. parkinsonii* FISCHER, Kew Bull. 1927 : 87 (1927) ; type : *Parkinson 1579*, Burma : Mandalay, Maymyo Rd. (lecto-, K, here selected).
- *B. altefissa* LÉV., Fl. Kouy-Tcheou : 266 (1914), p.p. *quoad Esquirol 3056*.

TYPE : Burma, Ava, Taong-Dong Mountains, 1826 ; Wall. Cat. No. 5786 (lecto-, K, here selected).

The name *Bauhinia brachycarpa* was first used by WALLICH on the specimen from Ava in Burma, No. 5786 of the "Catalogue" published between 1831-32 and validated by BENTHAM in Pl. Jungh. (1852).

When OLIVER (1888) described *B. faberi* on material from Sichuan he was not aware that this material was identical with *B. brachycarpa*. Even if he had been familiar with WALLICH's specimen, he might not have suspected the two samples as belonging to the same taxon, as the first one is a fruiting branch only. FRANCHET (1890) describes *B. densiflora* on material from Yunnan. At that time only few collections of this taxon was available and it is not astonishing that the very hairy collection of DELAVAY was established as a new species, still the author mentions that it is closely related to *B. faberi*. We have chosen to maintain this densely hairy taxon with a very restricted distribution as a variety under *B. brachycarpa* (see below). There are no qualitative differences between var. *brachycarpa* and var. *densiflora* except for the indumentum. Dissimilarities in pods and petals are treated below. *B. bryoniiflora* Franchet was described in the same publication as *B. densiflora* and indicated as very closely related to *B. faberi* ; they are inseparable.

B. tortuosa Coll. & Hemsl. was also published in 1890 ; in the protologue the authors emphasize that this taxon is related to *B. malabarica* Roxb., but of smaller dimensions. This is not the case, *B. malabarica* belong to another, very distinct group. The type-material of *B. tortuosa* is collected early and flowers and leaves are not fully developed ; THOTHATHRI (1967) designates the type in CAL ; we have seen an isotype in K with a drawing of the flower printed in the protologue, this may represent the original material used by COLLET & HEMSLEY for their description. It corresponds in all characters with *B. brachycarpa*.

B. enigmatica Prain also comes from the Shan Hills. PRAIN admits that it is related to *B. tortuosa* but separates it from this taxon by its longer pedicels and bracts, more acute

calyx-lobes and narrower petals; he also mention "the solitary ovule" as characteristic. The number of ovules in *B. brachycarpa* varies from one to a few, furthermore several authors as e.g. PRAIN, COLLETT & HEMSLEY do not realize that this species normally has unisexual flowers of which the male ones have a reduced ovary with one to few tiny, non-developing ovules. THOTHATHRI (1967) designated a type in CAL.

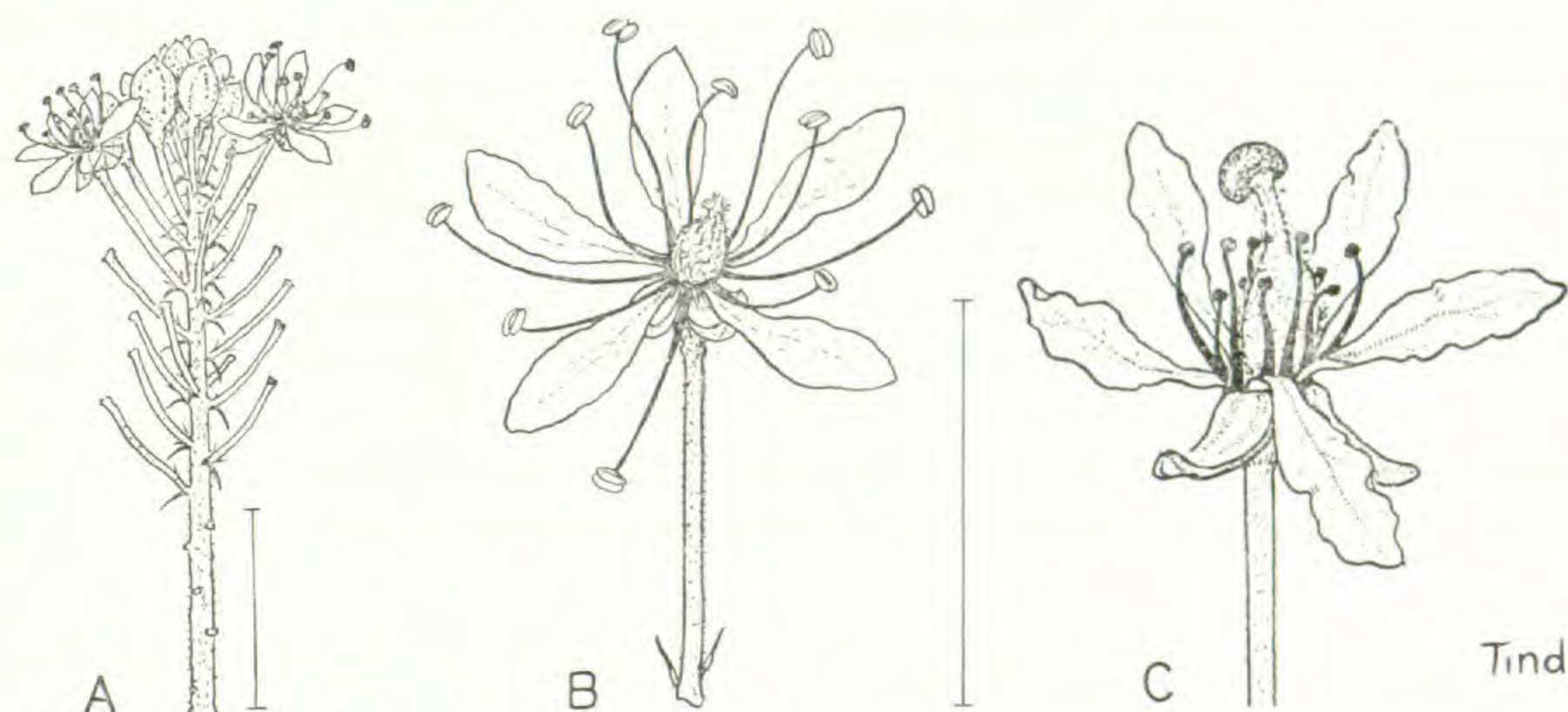


FIG. 1. — Inflorescence and flowers of *Bauhinia brachycarpa* var. *brachycarpa*: A, inflorescence; B, male flower; C, female flower. (A + B, Herb. J. H. Lace, Field No. 6237, K; C, Ducloux 5794, P). The scale is 1 cm.

B. bonatiana Pamp. described from Yunnan is a small-leaved "ecotype" from high elevation. The plate in the protologue shows two branches, one of which is var. *brachycarpa*, the other seems to match var. *microphylla* (see below). PAMPANINI is fully aware of this as he writes that *B. bonatiana* is closely allied with *B. faberi* and *B. bryoniiflora*, and adds that a closer study may reveal that only one species is represented. The type has not been seen by us; it is not in G, K or P; it may be found in FI.

The type of *B. cavaleriei* is another specimen of *B. brachycarpa* var. *brachycarpa* from Guizhou with pods and female flowers.

B. parkinsonii described by FISCHER (1927) from the Madalay area is by the author regarded as related to *B. polycarpa* Wall., which is a synonym to *B. viridescens* Desv., a species with a narrow, lax raceme (see LARSEN & LARSEN, 1980). The type-specimen of *B. parkinsonii* is clearly *B. brachycarpa*.

B. altefissa Lév. is a synonym to *B. yunnanensis* Franch., but one of the syntypes, i.e. Esquirol 3056 represents *B. brachycarpa*.

AMPLIFIED DESCRIPTIONS

Shrub or small tree up to 6 m high; young branches brownish pubescent, later glabrous. Leaves broadly ovate to subreniform, very variable in size, 2-12 cm broad $\times$ 1.6-11.5 cm long, 7-13-nerved, bifid $1/5-1/2$ with broad to narrow sinus; base truncate to cordate;

upper surface glabrous, lower glabrescent to pubescent particularly on the nerves, often with scattered, brown glands. Stipules narrow triangular to subulate, *ca.* 1.5-4 mm long. Petioles pubescent to subglabrous, 0.5-3 cm. Racemes short, dense, often leaf-opposed, 2-5 cm long. Pedicels slender, 5-14 mm. Bracts triangular to linear, 1-3 mm, bracteoles smaller, inserted at the base of the pedicel or slightly higher. Buds ovoid, acute to subacute (female flower buds often narrower than the male ones) brownish-pubescent often with scattered, brown glands, 3-7 mm long. Receptacle turbinate, very short, pubescent outside, woolly inside. Calyx splitting into two, later reflexed segments. Petals creamy-white, glabrous or scarcely pubescent outside, subequal, varying in shape from lanceolate to narrow obovate, 3-7 mm long, claw short. Flowers mostly unisexual : male flowers with 10 fertiles stamens, outer whorl as long as petals, inner whorl shorter ; anthers *ca.* 1 mm long, ovary reduced, *ca.* 1.5-2 mm, often with tiny ovules ; female flowers with 10 staminodes ; ovary stipitate, inserted in the middle of the receptacle, 3-5 mm long, densely hairy ; style short, stigma peltate. Pods dehiscent, strapshaped, enlarged towards apex, pubescent to nearly glabrous, $3-8.5 \times 0.7-1.3$ cm, often with a beak 0.5 cm long. Seeds 1-4, ovoid up to 1.1×0.8 cm. Bisexual flowers observed in very few specimens.

DISTRIBUTION : From Upper Burma, N. Thailand (one locality), N. Laos (one locality) to Western China (Yunnan, Sichuan, Gansu, Guizhou, Guangxi, and Hubei. It is also occurring in the Easternmost part of Xizang (Tibet).

ECOLOGY : Open habitats from the lowlands up to *ca.* 3000 m altitude.

NOTE : The specimens with largest leaves are found in the lowlands in Guizhou ; leaf-size diminish towards north and west and with increasing altitude, also the size of the pods and the number of flowers in the inflorescence diminish gradually along the same gradients.

MATERIAL STUDIED : BURMA : *Badul Khan* 89 (K) ; *Burke s.n.* (K) ; *Collett* 561 (CAL, K) ; *Dickason* 9327 (A) ; *English* 21 (K) ; 27 (K) ; *Khalil (Abdul) s.n.* (K) ; *Lace* 6236 (A, CAL, E, K) ; 6237 (A, CAL, E, K) ; (*Forest Ranger, Herb. Lace*) 4969 (CAL, E, K) ; *Lee s.n.* (K) ; *Parkinson* 1572 (K) ; 2077 (ABD, K) ; *Prazer s.n.* (CAL). — LAOS : *Poilane* 26294 (P) ; *Ward* 8909 (A). — CHINA : GANSU : *Meyer* 1797 (K, NY). GUANGXI : *Ching* 5211 (A, NY, W) ; 6432 (A, NY, W) ; *Ko* 55516 (A) ; 55911 (A) ; *Steward & Cheo* 564 (NY, P) ; 597 (A, NY, Sing, W) ; *Wang* 40870 (A). GUIZHOU : *Cavalerie* 3676 (E, P) ; *Esquirol* 3056 (E) ; *Schoch* 378 (A, W) ; *Teng* 90791 (A) ; *Tsiang* 7085 (A, NY) ; 7091 (A, NY) ; 7388 (A, NY) ; 8521 (A, NY). HUBEI : *Henry* 7179 (GH, *excl.* specimens in A + K) ; *Wilson* 2000 (A, K, NY, W) ; 2618 (A, *excl.* specimens in K, NY + W). SICHUAN : *Chu* 1726 (PE) ; *Faber* 760, 761 (K) ; *s.n.* (K) ; *Fang* 1507 (K) ; 3724 (A, E, K, NY) ; 6059 (A, E, K, NY) ; *Handel-Mazzetti* 1872 (W) ; 2074 (A, W) ; 3012 (W) ; *Kuan & Wang* 1504 (K) ; *Liu (Yu-Shin)* 1361 (A) ; 2023 (A) ; 2161 (A) ; 2310, 2311 (A) ; *Pratt* 731 (CAL, K) ; *Rock* 24136 (A, E, K, NY) ; 24577 (K, NY) ; *Schneider* 821 (A) ; 823 (K) ; 1556, 1557 (A, E, K) ; *Smith* 10346 (W) ; *Wilson* 3376 (A, E, K) ; 3377 (A, K) ; *Yu* 889 (A) ; *He Chang Hsien s.n.*, 1950 m (A) ; *s.n.*, 2350 m (A) ; 1347, 1500 m (A). XIZANG (E. Tibet) : *Chiao* 1714 (A) ; 2038 (A) ; *Wang* 66162 (A). YUNNAN : *Cavalerie* 4476 (E, K) ; 7975 (E, K) ; *Ching* 21047 (A) ; *Delavay* 502 (AAU) ; 2971 (P) ; *s.n.*, 9.5.1884 (P) ; *s.n.*, 20.4.1885 (K, P) ; *s.n.*, 19.5.1885 (AAU) ; *s.n.*, 7.6.1888 (P) ; *s.n.*, 3.6.1888 (P) ; *s.n.*, 5.6.1888 (P) ; *s.n.*, 20.6.1888 (AAU) ; *s.n.*, 8.8.1888 (AAU) ; *s.n.*, 27.8.1888 (AAU) ; *s.n.*, 3.9.1888 (P) ; *s.n.*, 18.6.1888 (AAU, K) ; *s.n.* (P) ; *Ducloux* 650 (K) ; 3742 (K, P) ; 4069 (P) ; 4070 (P) ; 4293 (P) ; 4391 (P) ; 5254 (P) ; 5794 (P) ; 7647 (P) ; *Fang* 2241 (A) ; *Feng* 685 (A) ; 1073 (A) ; 2420 (A) ; 11010 (A) ; 11413 (A) ; *Forrest* 4230 (A, E, K) ; 10403 (A, E, K) ; 10537 (E, K) ; 10905 (A, K) ; *Hancock* 146 (K) ; *s.n.*, 3.5.1896 (K) ; *Henry* 10289, 10289 A (A, K, NY) ; 11894 (A, K, NY) ; 13264 (A, E, K, NY) ; 13434 (A, E, K) ; *Maire* 3840 (NY) ; *Monbeig (= Manberg) s.n.* (K, W) ; *McLaren*

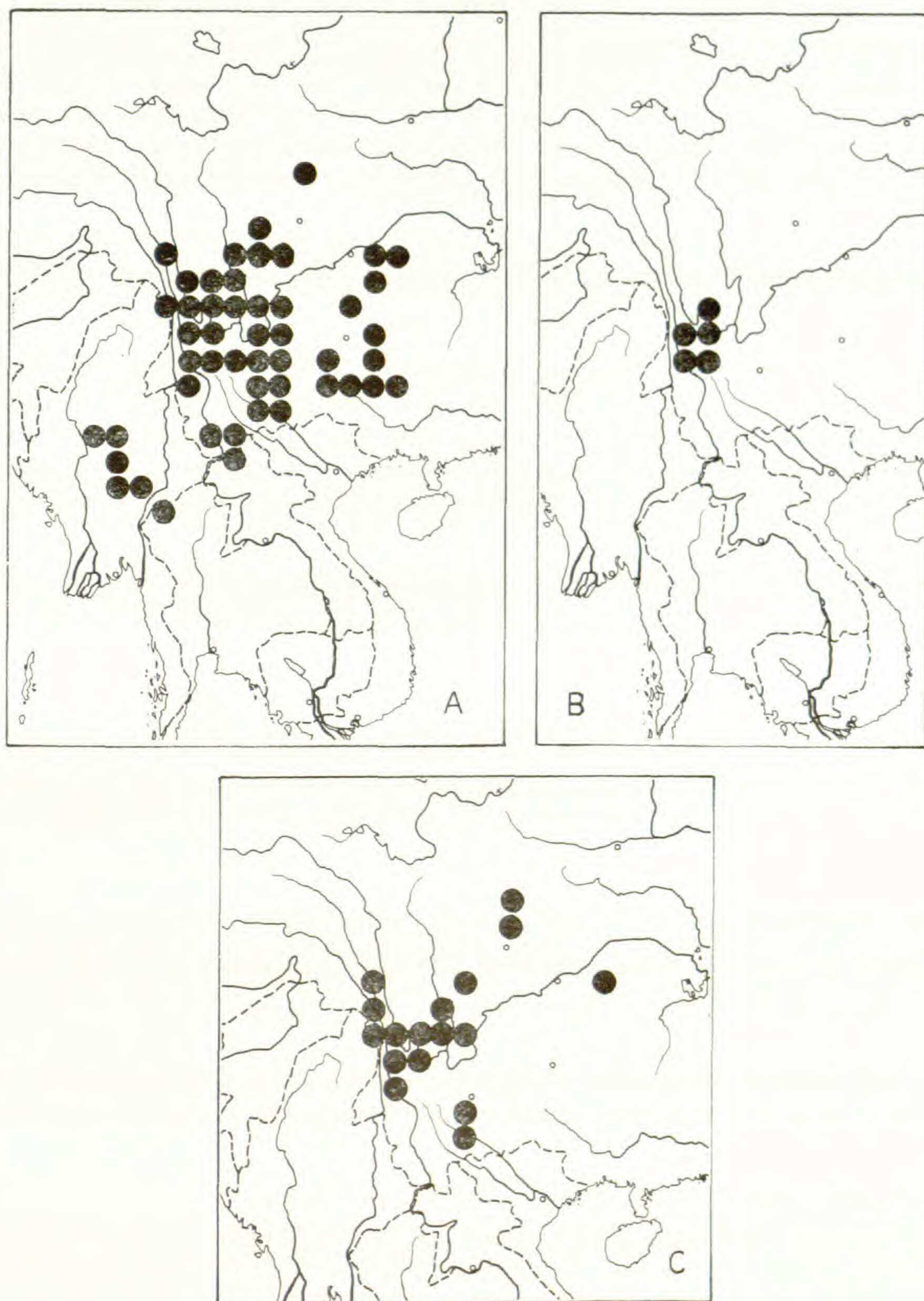


FIG. 2. — Distribution of varieties of *Bauhinia brachycarpa* : A, *var. brachycarpa* ; B, *var. densiflora* ; C, *var. microphylla*.

108 A (A, C, E); 208 F (AAU, C, E); Rock 3071 (A, W); 3189 (A, C); 5045 (A, NY, P); 6530 (A, E, NY); 7798 (A, E); 8488 (A, E, NY); 10480 (A, E, NY); Schneider 3091 (A, K); Schoch 14 (A, K); Soulié 1284 (K); Tanant s.n. (P); Ten 108 (A, E); Tsai 51185 (A); 52863 (A); 53408 (A, PE); 53615 (A); 53625 (A); 57301, 57521 (A); Tsiang 11338 (A); 11763 (A); Tsiang & Wang 16138 (A); Wang 71465 (A, PE); 74532 (A); 71522 (A); 76097 (A); 76563 (A, PE); 80340 (A); 80448 (A, PE); Wissmann 711 (W); 714 (W); 979 (W); Yu 5534, 5857, 7196, 7205, 10915, 14895 (A); 16345 (A, E). CHINA (loc. uncertain): Herb. Lévillé 659, Tin fa (E); Mell 41, Húpeh or Sichuan (K); Mombei s.n., 1907 (K); s.n., S.W. China (K); Wilson 3377, p.p. (K). — THAILAND: Garrett 1198 (A, B, E, L, P); Kerr 5565 (ABD, BK, BM).

2. var. **densiflora** (Franch.) K. & S. S. Larsen, *comb. & stat. nov.*

— *Bauhinia densiflora* FRANCH., Pl. Delav. : 191 (1890).

TYPE : Delavay s.n., China : Yunnan, Kiang-yu near Tali, 5.9.1888 (lecto-, P, here selected).

This is a rather distinct taxon deviating from var. *brachycarpa* by its densely hairy young shoots and inflorescence; upper leaf-surface glabrescent, lower densely woolly hairy; bracts somewhat longer, up to 6 mm, bracteoles also longer; mature pods more hairy.

DISTRIBUTION : North-western China : Sichuan and Yunnan.

ECOLOGY : As var. *brachycarpa* but mainly montaneous.

MATERIAL STUDIED : CHINA : SICHUAN : Handel-Mazzetti 7565 (A, E); Forrest 22414 (K, E). YUNNAN : Ching 20220, 22138 (A); Delavay 656 bis (P); s.n., 5.12.1884 (P); s.n., 12.1884 (P); s.n., 6.7.1885 (P, AAU); s.n., 26 + 28.7.1888 (AAU); s.n., 29.7.1888 (P); s.n., 23.8.1888 (P); s.n., 5.9.1888 (lectotype); 3496, 5.9.1888 (AAU); s.n., 28.9.1888 (P); s.n., 12.10.1888 (P); s.n., 10.1888 (P); s.n., 9.11.1888 (P, AAU); Ducloux 4514 (P); Forrest 12715 (K, E); 13307 (E, K); 21187 (A, P, E); Handel-Mazzetti 3411 (A, P, W); 5068 (W); Rock 5056 (A, E, NY); Schneider 1740 (A).

3. var. **microphylla** (Oliv. ex Craib) K. & S. S. Larsen, *comb. nov.*

— *Bauhinia faberi* OLIV. var. *microphylla* OLIV. ex CRAIB, in SARGENT, Pl. Wilson. 2 : 89 (1918).

TYPE : Henry 7179-1, China : Hubei (lecto-, K, here selected).

This variety deviates from var. *brachycarpa* in being a low, stunted shrub with smaller, subreniform leaves, 6-12 mm long, inflorescence with fewer and often smaller flowers and pods.

DISTRIBUTION : China : Hubei, Sichuan, Xizang and Yunnan.

ECOLOGY : Open land often on grazed soil, mostly above 1500 m alt.

NOTE : Henry 7179 consists of 3 collections on the sheath in K. We have numbered these 1-3. Only No. 1 corresponds to CRAIB's diagnosis of var. *microphylla*, and this sample was chosen as lectotype. There is an isotype in A, while the same number of HENRY in GH does not belong to var. *microphylla*. Our interpretation of var. *microphylla* is thus narrower than that of CHEN (1939) who also quote Henry 7179 from GH as an isotype.

It should be emphasized that there is no clear distinction between var. *brachycarpa* and var. *microphylla* but the large material available shows a clinal variation what also CHEN (*l.c.*) realized. If, however, var. *microphylla* is maintained it should be defined strictly sensu CRAIB. A number of CHEN's determinations to var. *microphylla* is by us regarded as var. *brachycarpa*.

A number of specimens are difficult to place, we have listed these separately as transition forms in herbaria annotated as "aff. var. *microphylla*".

MATERIAL STUDIED : CHINA : HUBEI : Henry 7179 (A, K — collection No. 1 & 2, *excl.* specimen in GH) ; 7179 *bis* (K). SICHUAN : Faber 762 (K) ; Smith 1701 (A, GB) ; 2310 (A) ; Wang, F.T. 21290 (A) ; Wilson 3374 (A, GH, K) ; Yu 1058 (A). XIZANG (E. Tibet) : Wang, C.W. 65493 (A) ; 66421 (PE), YUNNAN : Ching 20062 (A) ; Delavay *s.n.*, 25.5.1887 (P) ; 29719, *p.p.* (P) ; 4229 (A, E) ; 13298 (K, E) ; 13422 (K, E) ; Handel-Mazzetti 6227 (A, E) ; MacLaren C 88 (A, E, K) ; Maire 31 (A) ; 412 (NY) ; 441 (A, K) ; Schneider 1664 (A, E) ; Wang, H. 41407 (A) ; Yu 5886 (A) ; 9624 (A) ; 10388 (A, E). PROBABLY YUNNAN : Forrest 4228 (A, E, K) ; 19146 (K, E). CHINA (loc. uncertain) : Wilson *s.n.*, Central China (K.).

Transition forms between var. *brachycarpa* and var. *microphylla* (annotated in the herbarium sheets as "aff. var. *microphylla*") : HUBEI : Wilson 2618 (K, NY, W) *excl.* specimen in (A). SICHUAN : Faber *s.n.*, 4.1888 (K) ; Fang 1507 (A, NY) ; 3706 (A, E) ; Handel-Mazzetti 1321 (A, E, W) ; Smith 10270 (W) ; Wang & Wen 700 (A) ; Wilson 3375 (K). YUNNAN : Delavay *s.n.*, 3.6.1888 (P) ; *s.n.*, 8.8.1888 (P) ; Ducloux 5255 (P) ; Maire 6672 (NY) ; Schneider 3904 (A, K) ; Wang, C.W. 65048 (A) ; 65139 (A) ; 69128 (A) ; 81751 (PE) ; Yu 5946 (PE).

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